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EVERBEARING STRAWBERRIES

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FARMERS' BULLETIN 901

UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Bureau of Plant Industry

WM. A. TAYLOR, Chief

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STRAWBERRIES may now be had throughout the summer and autumn months in the northern United States. Plants of the everbearing sorts may be set in the spring and a crop secured in the summer and autumn of the same year. The habits of these varieties have led to the development of cultural practices differing in special details from those followed in the production of standard sorts. Such practices are described in this bulletin, giving directions for raising the everbearing sorts.

The plants are very hardy, their foliage is very resistant to disease, and under favorable conditions they continue to produce berries until hard frosts occur. These characteristics make them especially suitable for the home garden.

EVERBEARING STRAWBERRIES.

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DESIRABILITY OF EVERBEARING SORTS OF STRAWBERRIES.

MUCH INTEREST has developed recently in certain varieties of strawberries which bear fruit after the usual season. These so-called "everbearing" sorts produce fruit in early summer and under favorable conditions continue to do so until autumn. The term "everbearing" is not entirely satisfactory, but it has been in common use for several years and therefore is used in this bulletin. Heretofore the everbearing varieties have been grown chiefly by amateurs and by commercial growers who have tested them in comparison with ordinary sorts; however, a sufficient number of trials



FIG. 1.—A field of Progressive strawberries on the place where the variety originated at Conrad, Iowa. (Photographed Sept. 22, 1916.)

of these varieties has been made to indicate their real value for home use and for market in certain sections of the country.

The two leading varieties of this type of strawberry, the Progressive and the Superb, are notable not only because they produce fruit from the time of the usual crop until late summer or autumn, but also because they are exceptionally resistant to leaf-spot diseases. They are also very hardy. The Progressive has been found to withstand the winters of the Middle West better than any other variety except the Dunlap, one of its parents. The Superb, also, is hardier than most varieties of strawberries. Another remarkable characteristic of these varieties is that if their blooms are killed by frost they soon flower again. Therefore, in sections subject to late spring frosts, which often destroy the crop, these varieties are particularly valuable.

The markedly different behavior of these varieties in the field has led to the development of cultural practices differing in special details from those followed in the production of standard sorts. For this reason the information herein given concerning the origin and characteristics of these varieties has been prepared, and directions for their culture in so far as these methods differ from those used in growing the varieties which fruit only in the early summer are also included.

ORIGIN.

The Alpine strawberry, which is indigenous to many parts of the European Alps, has the habit of fruiting continuously from early summer to autumn. The fruit of the Alpine strawberry is small, and the horticultural varieties under cultivation are used only to extend the strawberry season. Although the Alpine berry was introduced into cultivation at least 150 years ago, it has never become of commercial importance.

During the latter part of the nineteenth century the Alpine strawberry was hybridized with large-fruited varieties which bear crops only in early summer, and, as a result, many "perpetual-fruiting," "autumn-fruiting," or "four-season" varieties, as they are called, bearing good-sized fruit, are grown in Europe. Among the best of these are the St. Antoine de Padoñe, St. Fiacre, St. Joseph, Merveille de France, and Louis Gautier, none of which has proved desirable in North America.

In this country most of the everbearing strawberries have had a very different origin. On September 28, 1898, Mr. Samuel Cooper, of western New York, while examining his field of strawberries, noted a plant with several runner plants attached, all of which were bearing blossoms and fruit in all stages of development. The plants among which these were found were of the Bismarck variety, which is reported to be a cross between the Van Deman and the Bubach.

Mr. Cooper set apart these plants which were bearing fruit in the autumn and named the variety the Pan American.

From the Pan American have been developed the leading everbearing varieties. Mr. Cooper has introduced the Autumn, Productive, Superb, Peerless, Onward, Forward, and Advance—all descendants of the Pan American. Of the varieties which have been widely tested to date, the Superb is the most valuable. Figure 2 shows part of a field of this variety on the place where it originated. The value of the Advance, Forward, Onward, and Peerless varieties has not been determined, although the Peerless seems to possess characteristics which may make it more desirable than the Superb.

Mr. Harlow Rockhill, of Iowa, has also produced many everbearing varieties, using in his work the Louis Gautier, one of the European everbearers, the Pan American, and many of the standard varieties which under normal conditions fruit only in early summer. The Americus and the Francis are the result of a cross between the Louis Gautier and the Pan American. Mr. Rockhill's best-known variety is the Progressive, a cross between the Dunlap and the Pan American. Figure 1 shows part of a field of the Progressive variety on the place where it originated. Other varieties originated by Mr. Rockhill are



FIG. 2.—A field of strawberries of the Superb variety set in April, 1915, and grown under the hill system on the place of the originator of the variety at Delevan, N. Y. A crop was picked in the autumn of that year, and another crop was picked in June, 1916. (Photographed June 28, 1916.)

the Iowa and the Standpat, both of which are results of crosses between the Pan American and the Dunlap.

Several other individuals, including workers at the Minnesota Agricultural Experiment Station, have originated new varieties which fruit during the summer and autumn months. These are being tested at the present time to determine their value.

CHARACTERISTICS AND ADAPTATION.

The everbearers are easily confused with other sorts unless certain facts are held clearly in mind. Ordinary early summer varieties may have a long season of fruiting under certain conditions; thus, in central Florida the Missionary variety begins to ripen soon after December 1 and continues to produce berries until after May 1. In the same section the Klondike and some others begin to bear early in February and continue in season with the Missionary. Farther north, however, these varieties produce an early-summer crop only, and that at the regular season. Conditions somewhat similar to those in Florida prevail in some parts of southern Texas.

In southern California ordinary varieties, such as the Brandywine and Exeelsior, bear almost continuously under irrigation from early in March until late autumn. The Brandywine produces one crop, and, after a short rest period, a second crop, and later a third crop. The Exeelsior and Melinda (*Molinda*), however, bear almost continuously from April to November in that section. Farther north on the Pacific coast the length of the fruiting season of all varieties is shorter, and in Oregon, Washington, and Idaho usually one crop only is harvested. Even in those States certain varieties when given a rest period after producing the early-summer crop and then irrigated will produce a second crop in the autumn.

In the eastern United States there is no definitely dry period, so that the plants do not have a real rest or dormant period after the harvest season. Under these conditions a second crop is seldom secured from the ordinary varieties. Occasionally, however, a prolonged drought followed by rains may furnish conditions favorable for a second crop; thus, in 1914 a grower at Harriman, Tenn., harvested a second crop of the Wallace (3-W) variety. In Kentucky the Early Hathaway (*Texas*) exhibits a slight tendency to bear in late summer whether the season has been dry or not. In Wisconsin, the Warfield occasionally has produced good fruit in the autumn, and the Dunlap at various times has produced a small second crop.

The everbearing sorts, however, differ from all of the above varieties in bearing fruit in the northern United States under favorable conditions continuously from the season of the ordinary varieties until frost. The quantity of fruit secured during this period varies

with climatic conditions, with the cultivation, and with the variety. The amount of fruit borne by the plants at the different periods of the year also varies.

Plants of the everbearing type which have been set for a year bear a fair crop at the time the usual crop is borne. For the period immediately after this early-summer crop, the amount of fruit secured is small. In August, September, and October it becomes larger, and, under favorable conditions, the late-summer and autumn crop from certain varieties may equal or exceed the early-summer crop. Thus, instead of a constant supply throughout the season, there is a distinct early-summer crop, then a period of comparative rest when little fruit is produced, followed by a long period when a fairly uniform amount of fruit is borne.

Weather conditions play an important part in the amount of fruit produced during the summer and autumn. Only when the moisture supply and other climatic conditions are favorable can the yield be constant. For this reason the results obtained from the varieties of this type of strawberry have varied greatly in the different sections of the country and in different years. If a long drought occurs while the plants are fruiting, the berries become small and the plants finally cease to bear. Therefore, they are not well adapted to sections having long droughts, except when irrigation can be supplied.

Other climatic conditions also influence the yield of everbearing strawberries. As all the varieties of this type have originated in northern States, where the summer heat is not great and where the rainfall is comparatively uniform throughout the year, they are best adapted to such conditions. In southern regions, where the Klondike and Missionary varieties are grown, the everbearing varieties have not yet proved well adapted. The Dunlap is grown commercially north of the regions where the Klondike and Missionary succeed, and it is in regions where the Dunlap succeeds that the everbearers are known to be adapted. These regions extend south to the northern parts of Virginia, Kentucky, Arkansas, and Kansas. South of these limits there are probably points where they may be grown with some degree of success, but they are not definitely known to succeed there at the present time.

In Oregon and Washington, the Superb, Americus, and Progressive have been grown successfully. In Idaho, where late spring frosts occur, the Superb has proved especially valuable, for when frosts have killed the bloom on varieties which fruit only in early summer, these will not ordinarily send out new flower stems until the following year, while the Superb will send out new flower and fruit stems immediately and produce a full crop.

Few reports of the value of these varieties in California are available, but nothing seems to be gained by planting them, as most of the ordinary sorts fruit there throughout the summer.

SOILS.

Growers of the Progressive and Amerieus varieties agree that a more fertile soil is required for them than for the ordinary sorts. The berries of both of these varieties are rather small, and a fertile soil is needed to increase their size. Another reason for their need of a fertile soil is that all the everbearers require a larger supply of moisture than do the sorts which produce only plants after the early-summer crop of fruit. A slight deficiency in the moisture supply seriously affects the size and quality of the berries, but does not noticeably affect plants producing runners only. A soil classed as very fertile contains a large amount of humus, and one important effect of a large humus supply is to increase the moisture-holding capacity of the soil. Any soil, therefore, containing large amounts of humus, or to which humus has been added by turning under green-manure crops or by the application of stable manure, will be better able to supply sufficient moisture, and one especially well supplied with humus should be selected.

The Superb and other varieties having similar characteristics, however, should be grown on a soil which is rather low in nitrogen. (For descriptions, see the section on "Varieties," pages 17 to 19.) In soils that are too rich, varieties of the Superb type bear a good crop in the early summer and then make a rank growth of leaves and runners throughout the rest of the growing season, just as do the ordinary early-summer sorts. Under such conditions, little fruit will be secured in the summer and autumn. For the best results, these varieties should be grown on a soil in which the supply of nitrogen is somewhat deficient for ordinary vegetable and fruit crops. The soil, however, should furnish an ample supply of moisture throughout the season, or water should be supplied by irrigation. This peculiar soil requirement of the Superb—that is, a soil somewhat lacking in nitrogen, but furnishing a good supply of moisture—is one reason why it has not been as popular in some sections of the United States as the Progressive. On the other hand, the irrigated sections of the Northwest are especially well adapted to the Superb, as many of the soil types are low in nitrogen.

FERTILIZERS.

Since the Superb and other varieties of its type should be grown on soil somewhat low in nitrogen, fertilizers containing nitrogen should not be applied ordinarily to plantations of these varieties. If

fertilizer is applied, it should contain only phosphoric acid and potash.

The Progressive and Americus need fertile soils, and stable manure usually can be applied with profit to plantations of these varieties. As much as 20 tons per acre may be used with good results, and some growers use even larger quantities. It will be found most satisfactory to apply the stable manure to the land the year previous to that in which the strawberries are set. Weed seeds in the stable manure can then germinate and be destroyed, while if the stable manure is applied directly to the plantation the cost of eradicating the weeds will often be considerable. Commercial fertilizers are rarely used with these varieties.

TIME OF PLANTING.

Plants of the everbearing type should be set at the same time as those of other varieties. The amount of fruit secured the first year, however, depends to some extent upon the time of setting. If the plants are set as soon as the ground is in condition in the spring, a larger crop will be secured than if they are set later. The plants also have opportunity to become established and to develop better root systems before beginning to fruit. If they are set rather late in the season, they show less tendency to make runners than when set very early.

PLANTING SYSTEMS.

The everbearers are grown under the matted-row and the hill systems of culture, and growers have been very successful with each. Under the hill system only the plants originally set are kept for fruiting, no runner plants being allowed to develop. Under the matted-row system, however, runner plants are allowed to root and form beds varying in width from a few inches to 3 or 4 feet. Larger crops of the everbearers probably can be secured the first year under the hill system than under the matted-row system. The cost of raising them, however, will be greater, as a much larger number of plants are set than under the matted-row system.

One of the most important factors in determining which system is to be used is the fruiting habit of the variety selected. Thus, the Americus, Francis, Standpat, and Progressive varieties fruit on the runner plants almost as soon as the runners take root, while the runner plants of other varieties bear very little fruit or none at all before the following year. During the first year, from a certain number of plants to start with, the varieties mentioned above usually will produce larger crops if they are allowed to form runner plants freely than if kept in hills. Figure 3 shows a plant set in the early spring which has runner plants with bloom and young fruit. The



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FIG. 3.—A strawberry plant at Osage, Iowa, set in the spring, having runner plants in bloom in midsummer. (Photographed July 13, 1916.)

Superb, Peerless, Autumn, and some others bear more during the first year if not allowed to make runners than if runner plants are allowed to form.

The plant-making ability of a variety, however, should be considered before deciding upon the system to be used. The Americus, Autumn, Francis, Pan American, Productive, and Standpat do not make runner plants as freely as the Progressive, Superb, and certain others, and thus are better adapted to hill culture than the last-named sorts.

In ordinary practice, therefore, the Progressive should be grown under the matted-row system and the other varieties under the hill system, except, however, in sections where the Superb and others of its type are kept for a spring crop.

DISTANCE OF PLANTING.

Under the matted-row system the plants should be set at the same distance as ordinary varieties, such as the Dunlap, Gandy, and Glen Mary—that is, from 18 to 36 inches apart in rows which are $3\frac{1}{2}$ to 4 feet apart. When set 2 by 4 feet, 5,445 plants will be required to plant an acre. About 50 plants, the number needed to set a square rod, should supply a small family with berries throughout the season.

Under the hill system the plants should be set the same distance as are the ordinary varieties. If set 18 inches apart in rows 3 feet apart, 9,680 plants per acre will be needed; if 18 inches apart in

double rows in which the single rows are 18 inches apart and the double rows 4 feet from center to center, 14,520 plants per acre will be required. Figure 2 shows a field of the Superb variety planted under the hill system in single rows; figure 4 shows a field of the Progressive variety set under the same system but planted in double rows.

REMOVING BLOSSOMS AND RUNNERS.

Flower stems begin to appear soon after the plants are set. Unless the plants are well established, these flower stems are a severe drain on the vigor of the plants, while very little good fruit will be secured from them. For this reason all flower stems which appear before the plant is thoroughly established should ordinarily be removed. If, however, growing conditions are favorable, the plants may become established very quickly and the removal of the flower stems will not be necessary. Figure 5 shows a young plant so thoroughly established that the flower stem need not be removed. When growing conditions are not favorable, the flower stems should be kept picked off until into July. Berries begin to ripen about a month after the flower stems are allowed to develop fruit, and continue to ripen until freezing weather occurs.



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FIG. 4.—A field of Progressive strawberries grown in double rows under the hill system at St. Joseph, Mo. All runners are removed as they appear. (Photographed July 15, 1916.)



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FIG. 5.—A strawberry plant of the Progressive variety set in the spring at Bridgman, Mich., which at the end of June shows a runner and a flower stem and is so thoroughly established that the flower stem need not be removed. (Photographed June 30, 1916.)

The removal of the flower stems does not cause the everbearers to revert to the early-summer fruiting type. The plants will make a more vigorous growth of leaves and runners when the flower stems are removed, sometimes making less fruit than if the stems had been left on. This, however, does not mean that they are reverting, but that for a time they are making plant growth at the expense of fruit production.

The following spring, if the plantation is continued, a fair to large crop of berries, depending on the variety, may be expected at the usual fruiting season, and after a period of two weeks to a month, in which comparatively little fruit is picked, the plants will begin to bear again. It will prove costly to pick off the flower stems during the spring of the second year, but where it is desired to secure as much fruit as possible after the ordinary varieties are gone the flower stems should be removed until about the time the ordinary varieties begin to ripen. If berries are then allowed to develop, they will be ready to pick in about four weeks.

In practice, growers using the hill system of culture commonly remove the flower stems the first year only, and those using the matted-row system rarely remove them, considering the expense too great.

Those growing the everbearers under the hill system also cut off all runners as they appear. This conserves the vigor of the plants, making them larger and more productive than those sending out runner plants. Some growers use a knife with which to cut the runners; others a hoe. Some of the runners may be removed at the time of each cultivation by attaching a runner cutter to the cultivator. When this is done it will be necessary to remove the remainder with a hoe.

TILLAGE.

Tillage should be very thorough, even more thorough than for the varieties that fruit in early summer, and unless a mulch is used should be continued from early spring until late autumn. In periods of drought, the cultivator should be used as often as once a week, for without an adequate and constant moisture supply a large crop of fruit can not be matured. Tillage should be shallow, especially near the plants, so as not to injure the root system or loosen the plants in the ground. A cultivator with many small teeth is best adapted to such use. The outer teeth of the cultivator which run next to the rows should be shortened so that they will not disturb the roots of the plants.

MULCHING.

When planted on some types of soil the berries are likely to become gritty if the tillage is continued through the fruiting season. To keep them clean, many growers use a mulch of grass, swamp hay, or straw, applying it at the beginning of the fruiting season. To fields grown under the hill system a heavy mulch may be applied. It will assist in keeping down weeds, in preventing the runners from rooting, and in conserving moisture. If a mulch is used on fields grown under the matted-row system it should be light, as a heavy mulch would prevent many of the runners from taking root.

DURATION OF A PLANTATION.

Those who grow the Progressive variety usually consider it best to set the plants early in the spring, pick a crop of fruit through the summer and autumn, and then discontinue the plantation, thus making the strawberry an annual crop from which the fruit is secured entirely in months outside the usual strawberry season. Those who wish to secure some fruit for the home table may leave the plantation until after the fruiting season of the following summer before plowing it up.

The berries produced on the 1-year-old plants, however, will be small compared with the common sorts, and will be smaller than the fruit of the Progressive variety secured in the summer and autumn of the first year. Figure 4 shows a field of the Progressive strawberry several years old. Fruit from this was comparatively small, although very large quantities of stable manure had been applied annually and the bed irrigated at frequent intervals.

The Superb and varieties similar to it under favorable conditions bear a fair crop of good-sized berries in the summer and autumn of the year they are set. At the ordinary season the following spring they yield a large crop of fair-sized berries, which under favorable

conditions will be as large as those produced by the common sorts. For this reason, varieties of the Superb type are much better adapted for use where the same plantation is to be maintained for several years than are varieties of the Progressive type. Figure 2 shows a field of Superb strawberries that had produced a crop in the summer and autumn of 1915 and another crop in June, 1916. This plantation was also allowed to fruit during the summer and autumn of 1916.

The duration of the plantation, therefore, will depend largely upon the variety used, but to some extent also upon the planting system and the climatic conditions in the section in which the plantation is made. If the Progressive variety and others of its type are used, it will ordinarily be best to set a new plantation each spring. If the Superb variety or others of its type are used, the plantation should be maintained according to the practice usually followed with varieties fruiting only in the early summer.

HARVESTING.

The harvesting of everbearing strawberries is similar to that of ordinary sorts, although more costly, as the fruit ripens through a long period and not as much is secured at one picking. The berries of some varieties of everbearers are of excellent quality, and, as they ripen in warm weather out of the usual season and bring a good price, should be carefully picked and packed in attractive packages. In the warmer part of the summer the berries will be soft and very difficult to market in good condition. Particular attention to careful handling will therefore be necessary.

In late autumn when the weather is cool the berries lose the high quality which they possess earlier in the season. Some berries may ripen even after hard frost, but such berries will not be of very high quality. The varieties differ greatly, however, in this respect, the Progressive remaining good in quality until cold weather, while the Superb has little flavor after cool weather begins.

YIELDS.

The yields secured will vary with the climate, the soil, the variety, and the attention given to culture. Up to the present time, everbearers have been grown chiefly by those using intensive methods of culture. Such methods increase the yields. The available records of yields are from the fields of those who not only use intensive methods but who have been successful, and the records, therefore, do not represent average yields. These records, however, show that throughout the northern United States, when set in early spring, the Progressive plants will begin bearing in July and will continue until hard frost occurs, provided moisture and other conditions are favor-

able. Under the best conditions, as much fruit can be secured in the summer and autumn of the first year as from ordinary varieties in early summer. To secure such results, however, water must be supplied in periods of drought and other conditions must be favorable.

In sections east of the Rocky Mountains the Superb variety and others of its type will not give as high yields as the Progressive and are not generally as desirable for the summer and autumn crop. When all conditions are favorable, however, over a thousand quarts per acre may be secured during this period. In the irrigated sections of Idaho, Oregon, and Washington, the yields in late summer and in autumn will be much larger, as the conditions in those States seem to be more favorable for this variety. The early-summer crop of the Superb ordinarily will be much larger and the berries much better than those of the Progressive; in fact, some growers have found the early-summer crop of the Superb as large as that of many of the common sorts.

VARIETIES.

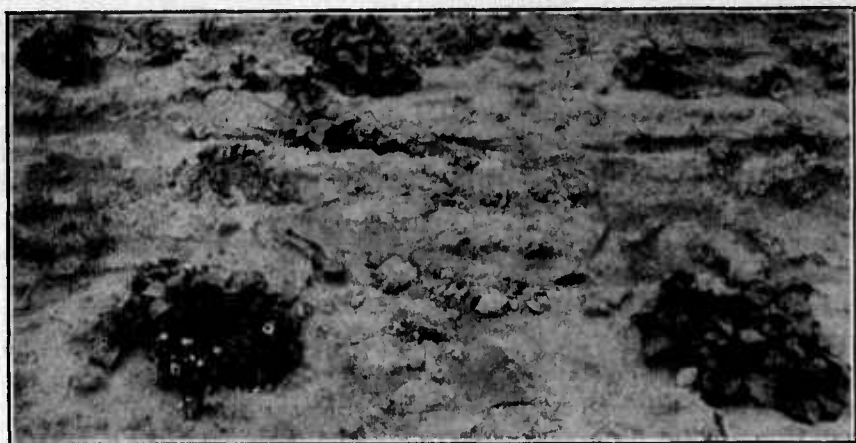
The varieties of everbearing strawberries in the trade at present are Advance, Americus, Autumn, Forward, Francis, Iowa, Onward, Pan American, Peerless, Productive, Progressive, Standpat, and Superb. In addition, a variety known as the Minnesota No. 1017, distributed by the Minnesota State Horticultural Society and the Minnesota Agricultural Experiment Station, has been introduced.

Only two of the varieties introduced, the Progressive and the Superb, have been widely grown as yet. The Americus is grown to a slight extent and the others very little. The Minnesota No. 1017 has been widely tested in Minnesota and is grown to a slight extent in surrounding States.



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FIG. 6.—Strawberry plants of the Minnesota No. 1017 variety at Excelsior, Minn. The plant at the left, producing much fruit, has no runner plants; the one at the right is producing a small crop of fruit and many runner plants. (Photographed Sept. 26, 1916.)



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FIG. 7.—Strawberry plants of the Minnesota No. 1017 variety at Excelsior, Minn. At the left in the foreground is a plant bearing a large crop of fruit but no runners; at the right in the foreground is a plant bearing no fruit and making no runners; the plants in the background have made a few runners. (Photographed Sept. 20, 1916.)

These varieties have been selected by strawberry breeders from large numbers of seedling plants as being best adapted to commercial purposes. When plants are raised from seed, some show no sign of bearing fruit at any but the ordinary season; other plants begin to fruit within three months from the time the seed germinates and fruit so heavily that no new plants are produced; while still others show sufficient vigor to produce both fruit and young plants. The varieties introduced likewise show great variation in their fruiting and plant-making habits. Moreover, the balance between the fruiting and plant-producing habits of many of the varieties is so even that frequently some plants fruit so heavily that no runner plants are made; other plants produce both fruit and runners; while still others may produce no fruit. This is especially noticeable if the plants are set late. Figure 6 shows a plant bearing a heavy crop of fruit, but no runners; and another plant producing some fruit and many new plants. Figure 7 shows two plants which have made no runner plants, one having a heavy crop of fruit, the other none. The plants in these illustrations were set rather late, and their difference in behavior is probably due somewhat to this cause.

Many other varieties are in the hands of breeders and will be introduced as soon as a sufficient stock has been secured. Some of them have been originated by men who have had long experience in strawberry growing and no doubt will be of great value. In addition, these breeders have many thousands of seedling plants of everbearers, from which many desirable varieties may be expected to appear. To replace present varieties, the seedlings should possess a high degree of resistance to leaf-spot diseases, exceptional vigor and hardiness,

and good quality, in addition to producing fruit in the summer and autumn.

Brief characteristics of the varieties in the trade at present are given here. Most of them have been placed in two classes: (1) Those with fruiting habits somewhat similar to the Superb and (2) those with habits more like the Progressive. Those originated by Samuel Cooper are more like the Superb, while those originated by Harlow Rockhill have fruiting habits resembling the Progressive or Americus. Except when otherwise noted, the varieties are perfect flowered and may be set alone.

Advance.—Very similar to the Superb and the Peerless. It is not recommended for replacing either of these varieties, although it is perhaps somewhat firmer in flesh than either of them.

Americus.—Plants vigorous, deep rooted, runners forming fewer plants than many varieties; foliage rather sparse, exposing the berries somewhat; fruiting stems long; berries medium to large, firm, light red, often having a green tip when the body of the berry is fully ripe; dessert quality the best of any perpetual.

This variety is a cross between the Pan American and the Louis Gautier, originated in 1905 by Harlow Rockhill, of Iowa, and introduced in 1912. It is better adapted to heavy soil types than to sandy loams. Runner plants often begin to bear as soon as they start to root. The June crop is sometimes heavy and very good, and under favorable conditions the same plants will bear constantly from June until November. The variety is grown very little at the present time, but, because of its excellent quality, is liked by some growers, especially for hill culture in home gardens or for local markets.

Autumn (flowers imperfect).—Originated by Mr. Samuel Cooper, of New York, in 1902 from seed of the Pan American and introduced in 1906. It has been replaced by better varieties and is grown very little at the present time.

Forward.—Very similar to the Superb and the Peerless, but not recommended for replacing them.

Francis.—Plants not as vigorous as those of Americus, the runners forming fewer new plants; fruiting stems long; berries large, often irregular in shape, attractive; dessert quality very good, but not equal to that of Americus, Progressive, or Superb.

This variety was originated by Harlow Rockhill in 1905 at the same time as the Americus and as a result of the same cross. It is best adapted to light, sandy soils. The runner plants begin to fruit as soon as they start to root. The variety, however, is grown very little at the present time, although at one point in northern Michigan it is considered desirable.

Iowa.—Plants rather vigorous, sometimes making a good number of runner plants and sometimes very few; foliage abundant, protecting the flowers from frosts and rains; fruit stems short; berries medium in size, globose, fairly firm, dessert quality fair, but not as good as Americus, Progressive, or Superb.

The variety is a cross between the Dunlap and the Pan American, originated by Harlow Rockhill and introduced in 1911. The runner plants do not bear much the first year, and it is inferior to the Progressive as a commercial berry. It is grown very little at present.

Onward.—Very similar to the Superb and the Peerless, but it is not recommended for replacing either of these varieties.

Pan American.—Plants vigorous, but they do not make many new runners; foliage susceptible to mildew; fruit stems short and well protected by the leaves from rain and frost; berries medium in size, dessert quality fair.

The first plants of this variety were found by Samuel Cooper, of New York, in a field of Bismarck, and it is supposed to be a sport of that variety. Only a small crop is borne in the autumn. It is grown very little at present and is known chiefly as a parent of most of the everbearers.

Peerless.—Very similar to the Superb, and although recently introduced is considered slightly superior to it in being larger in size, better in dessert quality, and more productive. It is adapted to conditions similar to those under which the Superb succeeds and should replace that variety in many sections.

Productive (flowers imperfect).—The result of a cross between the Pan American and the Autumn, originated by Mr. Cooper. As the berries are of poor quality and the foliage is very susceptible to leaf-spot, it is not to be recommended.

Progressive (*Nevastop*).—A cross between the Dunlap and the Pan American made in 1908 by Harlow Rockhill, of Iowa, who first sent it out for trial in 1911. It is described by him as follows:

The plant is medium sized, closely resembling the Dunlap; foliage strong and healthy, has a good root system, and makes about as many plants as Dunlap. Spring-set plants fruit the same year as set out. New plants generally fruit in a short time after taking root. Blossoms are strongly staminate and very resistant to cold. Blossoms and fruit are well protected by foliage. Fruit is of good medium size with slight neck. Color deep red inside and out, quite firm, quality rich and sweet.

This is a good characterization of the Progressive. The plants are the most vigorous of all of the everbearers now in the trade, and are, so far as observed, the hardest variety of strawberry now grown in this country, enduring the extreme climate of the upper Mississippi Valley remarkably well. The foliage is very resistant to leaf-spot diseases. Both the plant and fruit closely resemble the Dunlap. The spring crop begins to ripen very early—8 to 10 days earlier than Dunlap, and usually earlier than Excelsior, Michel, and other early sorts. It is adapted to sections where the Dunlap succeeds and should be planted on fertile soils.

Standpat.—Originated by Harlow Rockhill in 1906 and introduced in 1914. It is lighter colored and larger than the Progressive, is too soft for shipping, and makes new plants slowly. It is not recommended for general planting at the present time.

Superb.—Plants vigorous, runners long and do not form a thick mat of plants except on moist rich soil; foliage very resistant to leaf-spot diseases; berries medium to large, globose to globose conic, fairly firm, color variable, often light red until very ripe, when they turn dark; mild subacid; dessert quality good in the summer, but lacking in the autumn.

The Superb is a cross between the Sherman (a seedling of the Pan American) and a seedling resulting from a cross between the Autumn and Cooper. It was originated in 1908 by Samuel Cooper and introduced in 1911. It is especially adapted to poor soils provided there is plenty of moisture. Runner plants rarely bear fruit the first year. The berries resemble the Chesapeake in appearance. The first crop in parts of Michigan and in certain other States is reported equal to that of some of the ordinary varieties. It is grown more than any other perpetual except the Progressive, but probably should be replaced by the Peerless in most sections.

Minnesota No. 1017.—In Minnesota, as compared with the Progressive, this variety is more vigorous, not as good a runner maker, and fully as productive; the foliage is much more susceptible to leaf-spot diseases; the berries are larger, more globular, fully as firm, slightly darker red in color, and of as good dessert quality.

The variety is a cross between the Pan American and the Dunlap and originated at the Minnesota Experiment Station Fruit-Breeding Farm in 1910. At certain places in Minnesota it has been reported to be more productive than the Progressive, while in other sections it has been so badly affected by leaf-spot diseases that it has been discarded. It is not recommended at present for general planting.

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